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ABSTRACT

Project CIRCUIT (Curriculum Improvement Resulting from Creative Utilization of Instructional Two-Way Television), a two-way interactive video and audio system serving the schools of Trempealeau County, Wisconsin, was evaluated in its second year through interviews with teachers, students, administrators, and the project director, and examination of project records and media coverage. Using the facilities and equipment of the earlier Trempealeau County-Kellogg project, CIRCUIT provided two-way interactive instruction among the eight schools of the county. Recommendations made on the basis of the evaluation findings include the following: (1) the level of cooperation among the eight schools should be increased; (2) proper facilities for two-way televised instruction should be provided within each school; (3) a means for distributing paper materials among the schools should be developed; (4) electronic devices should be installed so the schools can selectively scramble transmissions; (5) teachers' organizations should become involved in the development of uniform policies for job security and compensation; (6) continued research should be encouraged; (7) audio and video transmission quality should be closely monitored; and (8) greater attention should be given to training teachers in the use of the system. Four references are cited in this report. (Author/LMM)

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Two-Way Telecommunications:
A Viable Technology for Rural Instruction?

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ABSTRACT

Two-Way Telecommunications: A Viable Technology for Rural Instruction?

by
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This paper summarized the evaluation efforts for the second year of Project CIRCUIT, a two-way interactive video and audio system serving the schools of Trempealeau County, Wisconsin.

Using the facilities and equipment of the earlier Trempealeau County-Kellogg Project, CIRCUIT provided two-way interactive instruction among the eight schools of the county.

After interviewing teachers, administrators, and others closely associated with the Project, a list of evaluation concerns and questions were developed. Investigation of the evaluation concerns and questions was accomplished by interviewing teachers, students, administrators, and the Project Director. In addition, investigation was made of Project records, media coverage, etc. Guidance in the evaluation effort was provided by an Evaluation Advisory Committee.

Major findings were reported by areas of evaluation concern.

Recommendations made on the basis of the evaluation findings included the following:

1. the level of cooperation between the eight schools should be increased,
2. proper facilities for two-way televised instruction should be provided within each school,
3. a means for distributing paper materials among the schools should be developed,
4. electronic devices should be installed so the schools can selectively scramble transmissions,
5. teachers' organizations should become involved in the Project regarding job security and compensation,
6. continued research should be encouraged,
7. the quality of the audio and video transmissions should be closely monitored, and
8. greater attention should be given to training teachers in the use of the two-way system.

Introduction

Trempealeau County is located in west central Wisconsin, just north of "God's Country" made famous in the television beer commercials. It is an area of beautiful deep valleys and steep hills, difficult transportation, subsistence farming, and high unemployment. The eight school districts in the county are small, ranging in enrollment from 250 to 1,588 students, K-12. A total of 6,724 students were enrolled in the district schools during the 1981-82 school year. Projections indicate that enrollments will continue to decline until 1992 and will stabilize after that year.

While there has been a great deal of cooperative vocational education, especially among the five schools in the central part of the county, many of the schools have lacked the comprehensive curriculum characterized by larger school systems. Several of the schools of Trempealeau County have not had foreign language programs, several have lacked advanced mathematics and specialized vocational curricula.

Although a great deal of school consolidation has taken place (as indicated by the hyphenated district names, e.g. Galesville-Ettrick-Trempealeau, Osseo-Fairchild, and Eleva-Strum), smaller districts still face the threat of forced consolidation and dissolution. Of greatest immediate concern, however, is the reduced levels of federal and state funding available to the schools of Trempealeau County.

Ensuring Excellence in Rural Education stated the situation in Trempealeau County, Wisconsin very well when it summarized the problems of rural schools in general:

Rural school districts average about 20 percent less spending per pupil than metropolitan districts and have fewer extended educational services, such as vocational education and preschool programs. While geographic isolation protects many rural school districts from the social problems of urbanized areas, it also deprives them of the resources of the cities, such as cultural experiences and professional development opportunities. Also, transportation of students in sparsely populated areas is extremely costly and administratively burdensome (Executive Summary).

The same report went on to say,

The most promising development for rural schools is the integration of new technologies into the rural education programs. Rural educators generally believe technology can provide rural schools with greater flexibility in the curriculum and can help overcome distance, transportation, and cost barriers rural schools face in providing quality programs (p. 47).

Project CIRCUIT

Project CIRCUIT is such a technological innovation. Funded under ESEA Title IV-C as an Innovative/Exemplary project, CIRCUIT (Curriculum Improvement Resulting from Creative Utilization of Instructional Two-Way Television) is a spin-off from an earlier effort known as the Trempealeau County-Kellogg Project.

Trempealeau County-Kellogg Project

In order to understand the context of Project CIRCUIT, the Trempealeau County-Kellogg Project must first be briefly described. The following is excerpted from the booklet,

"Trempealeau County Kellogg Project: A Rural Telecommunications Service System" (pp. 3-5).

The basic objective of the project was to plan, develop, and implement a county-wide, multi-service, broadband, interactive, telecommunications system to enhance the quality of rural life.

Trempealeau County is a rural county, located in West Central Wisconsin, with a population of approximately 25,000. Arcadia is the largest community in the county with 2,159 residents; and Whitehall, the county seat, has 1,486 residents. The county is approximately 26 miles wide and 62 miles long. Farming, light manufacturing, and small business provide the majority of employment in the area. Its rural nature can best be described as a county without any parking meters or traffic lights and one where there are more cows than people.

The overall project planning and achievements were the results of numerous individuals and agencies working together towards the development and establishment of this concept. Historically, it can be highlighted as follows:

December 1973	Western Wisconsin Communications Cooperative (WWCC) established
January 1974	General plans drafted and Rural Development Act loan requested from Farmers Home Administration (FmHA)
June 1974	FmHA conditionally approves WWCC loan proposal
July 1975	Eight school districts adopt the concept of the system at their annual meetings and adopt a 15-year lease agreement with the WWCC
May 1976	Wisconsin State Statute changed to allow long-term lease agreements for Wisconsin school districts
September 1976	W. K. Kellogg Foundation approves a grant application of \$510,170
January 1977	Kellogg phase of the project began involving the WWCC, eight LEAs, and the four universities of the West Central Wisconsin Consortium (WCWC)

February 1978	Nine community City Councils/Village Boards accept a cable television franchise
November 1978	Construction of the system began, with American Electronic Laboratories as the contractor
November 1978	FmHA loan to the Cooperative approved for \$1,466,000
July 1979	First TV signal delivered on the system to a WWCC subscriber
December 1979	First two-way interactive television transmission between two schools
March 1980	System completed and accepted by WWCC

The commitments of the eight school district school boards, the school superintendents and their respective staffs, and the WWCC Board of Directors have been most significant in the development of the project. But, probably the most important factor was the grant from the W. K. Kellogg Foundation, Inc. which assured that the project would become a reality. The resources received from the Foundation enabled the WWCC to maintain its planning and development process which the conditions of the FmHA loan were being met. It also provided the necessary resources for the school districts and for the four universities to plan and develop a program for alternative applications of the system.

The equipment purchased through the Kellogg Project, and provided to the schools, enabled each school district to become a television programming origination point. In addition, staff training was also accomplished through these resources. The overall project coordination in the developmental stage was a critical process, and its achievements would not have been accomplished without this significant support... (pp. 3-5).

Of the 36 channels available on the system, 19 are presently in use. Ten entertainment channels, along with a community access channel from the County Court House in Whitehall are available to WWCC subscribers. The eight remaining channels are used to provide a full two-way cable television service between the eight school districts of the county.

Project CIRCUIT

Project CIRCUIT began in the fiscal year 1980-81 with four general goals. They were to: 1) coordinate the individual educational efforts of eight rural school districts in the effective and efficient use of a two-way instructional television system, 2) develop increased staff and student expertise in the use of two-way cable television instruction, 3) improve the quality and increase the quantity of educational offerings across the total eight school district consortium, and 4) utilize individual community resources to enrich and add reality to the total educational program.

During its first two years of operation, the eight schools used the two-way system in a variety of ways. In-service training in the use of the two-way system was conducted, and community resources and video taped presentations were used. "Project schools have originated live programs on energy, drug and alcohol abuse, a political forum, financial aid for parents of prospective post secondary students, career awareness presentation from Western Wisconsin Technical Institute, and viewing new equipment operation for proposed music and television offerings. Also, programs have been videotaped in the areas of health, energy, and life throughout the county and were aired and viewed in each school many times throughout the year" (Annual Report, 1981, p. B-9).

The eight school systems involved with the Project include Galesville-Ettrick-Trempealeau (GET) with a 1981-82 enrollment of 1,588 and 88 teachers, Osseo-Fairchild with an enrollment of 1,219

and 85 teachers, Whitehall with 903 students and 61 teachers, Eleva-Strum with 933 students and 50 teachers, Arcadia with 891 students and 56 teachers, Blair with 560 students and 40 teachers, Independence with 380 students and 33 teachers, and Taylor with 250 students and 21 teachers. There were no private schools involved in the project. A total of 6,724 students were enrolled in the public schools in Trempealeau County and there were 434 teachers in those districts. The locations of the schools and the types of telecommunications links are shown on the map in Appendix A.

Project CIRCUIT had a full time director and secretary who were located in the high school in Osseo, Wisconsin. An advisory board to the director was made up of representatives of each of the school districts. The members of the advisory board, appointed by the superintendent of each school district, represented teachers, administrators, and support personnel in the Project schools.

Evaluation Concerns and Questions

Because of the unique nature of the two-way telecommunications system, little guidance was available in the development and implementation of the activities needed to carry out an evaluation of the Project. However, in discussions with the Project Director, representatives from the Wisconsin Department of Public Instruction (DPI), technical consultants, project evaluator from the Trempealeau County-Kellogg Project, and with teachers in two of the school districts and with the CIRCUIT

Evaluation Advisory Committee, several areas of concern became apparent. These areas of concern included the following:

1) the technical quality of the video and audio transmission. Communication is essential for any type of instruction and learning to take place. Therefore, it was essential that the communication links be of sufficient quality that both teacher and student be able to both see and hear without difficulty.

2) instructional use of the system. Instruction via two-way telecommunication is a new concept. Therefore, information was gathered to guide the teacher training and course development process.

3) administrative support. It is well documented that administrators are a critical factor in the adoption of innovations in education. Therefore, the success or failure of the two-way telecommunication system was dependent on the type of support given by the local school administrators.

4) inter-school relations. Local school districts are generally very jealous of their autonomy and independence. A project such as this, however, required a minimum of cooperation among the districts involved. Therefore, it was necessary to obtain information about the extent of cooperation to assess the success and failures of the Project.

5) overall impact of the Project. Summative information was needed to indicate the degree of goal attainment, the successes and failures of the project.

Methodology

An Evaluation Advisory Committee was established to provide guidance and to assist the Project Evaluator in conducting the evaluation activities. Members of the Committee were selected by the Project Evaluator on the recommendation of the Project Director and representatives of the Wisconsin DPI. An attempt was made to obtain a balanced committee which consisted of both teachers and administrators and represented a variety of opinion regarding two-way interactive televised instruction.

Each of the eight school districts was visited twice by the Project Evaluator in order to obtain information relative to the

evaluation concerns listed above and the more specific evaluation questions imbedded within those concerns.

Both rounds of interviews with faculty, administration, and students of the eight schools involved a total of over 90 hours of interview. Site visits were conducted during the months of November and December 1981 and March and May 1982. The first round of interviews was tape recorded and all persons interviewed during both rounds of interviews were guaranteed confidentiality. Interviews of students were conducted by a graduate student in the Media Technology Department at the University of Wisconsin-Stout. The student interviewer received training in interview methods, strategies, and ethics from the Project Evaluator. The student interview schedule was developed by the Project Evaluator.

A meta evaluation using the Standards for the Evaluations of Educational Programs, Projects, and Materials was conducted by Dr. Robert Rodosky of the Evaluation Center at Western Michigan University.

Findings

Selected major findings are presented in the section which follows.

Findings related to the technical quality of the transmission.

Although there originally was some concern about the quality of the transmission coming from the cable facilities, those problems apparently were solved by the Cooperative.

The addition of a small receiver placed close to the teachers also solved the problem of the teacher being able to monitor the

students at the remote sites. During the second round of interviews, neither the teachers nor the students indicated a major problem with hearing or seeing the remote sites or the television teacher.

A concern arose regarding the inadequate facilities for televised instruction found at four of the schools.

An additional concern had to do with the replacement of equipment as it becomes irreparable. None of the districts have developed a funding procedure to handle anticipated future expenses for equipment. The common response of administrators was that the AV equipment has always been purchased and/or replaced as needed.

All equipment appeared to be in good working order during the site visits. No complaints were heard regarding improperly operating equipment other than color adjustment on some of the color cameras. None of the schools had made arrangements, however, for regularly scheduled maintenance of equipment other than for minor cleaning.

Findings related to the instructional use of the system.

Teachers who were using or had used the two-way system for instruction, as well as students who had received instruction via the two-way system, were the major sources of information for this section. It should be noted that experience with the system is still limited and that much more experience and investigation is needed before definitive answers can be given. Because of the complex nature of this question, the answer is developed in the

following order: 1) physical and equipment facilities, 2) student selection, 3) the electronic "classroom," and 4) teaching.

Physical facilities and equipment. The telecasting teacher should have one monitor for each of the receiving sites. Thus, if the teacher is telecasting to three sites, s/he should have a separate television monitor for each of the sites. It must be noted that efforts are being made so that this will be the case at each originating site.

It was the consensus of opinion among the teachers who were using the system, as well as most of the building administrators, that a special place be developed and used for both sending and receiving televised instruction. This place should be free from interruptions and both visual and aural disruption. It should be such, however, that students could receive supervision.

In addition, the lighting should be of high enough intensity that the television camera can pick up adequate images. Finally, attention should be made to the acoustics of the room and to the type, number, and placement of microphones.

It can be reported that three of the schools have built what appear to be excellent facilities, and a room was being remodeled in another school. The television facility, however, was shared with the elementary library in one of the schools, with a microcomputer lab at another school, with an AV storage area at another; and in the last school, a traditional classroom was being used.

While some type of room should be provided that would minimize disturbance, the room should not be isolated from the other parts of the school since students often would be in the

"television room" without direct teacher supervision; it was suggested that some unobtrusive means of monitoring the students be provided (such as a window in the room).

Student selection. Student selection emerged as one of the keys to success or failure of the two-way system as a vehicle for instruction. Teachers and students alike indicated that mature and highly motivated students were more likely to have success when instruction is via the two-way. Neither students, teachers, nor administrators felt that the two-way system could be used effectively for general education subjects such as history or English, except for use in presentation of special events, guest speakers, or visiting teachers.

The electronic classroom. An important distinguishing characteristic of the two-way system is that it enables two-way television communication between the teacher at one site and students located at remote sites. Because the communication takes place via an electro-mechanical device, the development of teacher-student rapport and a true "classroom" atmosphere may be difficult to achieve. A number of techniques were used by teachers to try to develop this atmosphere. Teachers traded locations, and they held joint parties and classes with remote and home site students together.

In at least one instance, school chauvinism caused a minor problem when students at one site made derogatory remarks about the intellectual abilities of students at another site. One suggestion made by students at remote sites was that it would be desirable for them to see the students at the origination site more often. They suggested that the camera be taken off the

teacher occasionally and directed toward the origination class, especially when a student at the origination site was making a comment or answering or asking a question.

Finally, students indicated that the time spent "alone" with the teacher (due to daily schedule incompatibility) was a time when the teacher and students were able to build the needed rapport and trust. Questions could be asked which might be embarrassing. In spite of the problems caused by the incompatible daily schedules in the various schools, the time waiting for a class period to begin was not wasted time--it served as a time to build the needed rapport. This factor must be considered as the eight schools attempt to work out a common daily schedule.

Teaching. In the Interim Evaluation Report the following points were made:

- 1) Teachers using the system require administrative support.
- 2) Teachers need preparation time for the televised class.
- 3) Classes at each site must be kept small.
- 4) Teachers need technical assistance in setting up and operating the equipment.
- 5) The question regarding having a "live" class is based on teaching style and at this time can only be answered by the teacher with experience in both types of settings.

Little new can be added at this time.

Findings related to administrative support for the system

Attitudes of building administrators in the eight schools ranged from highly enthusiastic to very skeptical. For the most part, even the building administrators who were skeptical about the present use of the system, commented about the great potential

of the system. In light of an uncertain future in terms of enrollments and funding, they tended to look upon the two-way system as something of a curricular safety net--a system which they hope would not be needed, but would gladly use if the local conditions demand.

It was pointed out by building administrators and advisory board members alike, that among the many concerns of the building administrator, Project CIRCUIT and the two-way television system were sometimes forced into a low priority position. Many administrators explained that the two-way system could not get their support until they could see it making a direct positive contribution to the solution of their local problems. Project CIRCUIT has yet to do this -- instead, it was perceived to be an additional set of responsibilities for the building administrator.

The major support needed, as indicated by teachers using the two-way system, was time. Both teachers using the system and their building principals realized that televised instruction required more planning and consideration than did traditional classroom teaching. Fortunately, the schools have been able to devise a release time scheme for teachers who were be using the system for the first time.

In addition to time, teachers using the system also need technical and logistical assistance from their local AV specialists and their staffs.

Students, the final consumers of the two-way televised instruction, also required support in using the system. First, students needed to be made aware of the curricular offerings available to them, whether the instruction came via the two-way

system or via traditional means. Secondly, students needed the assistance of their schools in scheduling those classes, even though it may have caused minor disruption in the daily schedule of the respective school. Third, students needed assistance in handling the logistics of getting assignments turned in, tests given and returned to the teacher, handouts distributed, etc. Finally, students needed assistance with questions and problems they may have had outside of regular class sessions.

Because of late curricular planning for the 1981-82 school year, few students were made aware of the expanded curricular offerings afforded by the two-way system. All students interviewed said, however, that their teachers and guidance counselors had been helpful in encouraging them to take a television course.

Assistance in scheduling television classes apparently has been good. Few building administrators could go so far as one principal who said that if a student really needs a class, they can build a course schedule around him/her. Most indicated that a two-way course would be scheduled just as any other course would be, and that if students face a schedule conflict, they would have to make the choice based on their own priorities.

The problem of distributing handouts, assignments, and tests remained unresolved. Presently the television teachers and their students in the remote sites must rely on existing transportation systems -- U.S.P.S., busses, commuting teachers, etc.

Finally, all learning is not confined to the 55 minutes of the traditional class period. Students have problems and questions outside of class time and these must be resolved. For

the student at the origination site, it was simply a matter of finding the teacher during a study hall, preparation period, or after school and getting the needed assistance. For the students in the remote site the problems were not so easily solved, however. They had to rely on friends to help them (sometimes the friends could not), the answer book (in case of a math course), other teachers in the school, and community persons. Depending on the knowledge and sophistication of the source of help, this situation could cause problems for the teacher since the student might be receiving wrong information from these other sources and would have to re-teach to correct the misconceptions developed by the alternate source of help. This situation did develop during one class session observed by the evaluator.

Findings related to interschool relations

There was little evidence of long-range curriculum planning for the use of the two-way television system. Curriculum continued to be developed by the schools on an ad hoc basis from year-to-year. The process of curricular development generally was for each school to determine its curricular capabilities for the coming year, look at the needs of the students, then try to match up unmet needs via the two-way system.

In determining what kinds of courses that could be put on the two-way system, the schools have tended to look at what courses had less than a full class enrollment or at teachers who had less than a full class schedule and then offer them to the other schools via the system. While this process as described may have

been very expedient and pragmatic, it by no means represented a coherent and systematic approach to curriculum planning.

A number of logistical considerations have been raised. These include school calendars, daily schedules, movement of materials, and the sharing of resources. There appeared to be no easy way to bring a common (or at least similar) school calendars among all eight schools. Members of the "Five School Coop" have, over the years, developed very similar school calendars. But that was only five of the eight schools. The two schools in the northern part of the county have developed cooperative arrangements with schools north of the county and abide with those arrangements. The same situation existed with the school in the southern part of the county.

Daily schedule compatibility also has been perceived to be a problem. While widely differing daily schedules would have a detrimental effect, it is noted that daily schedules were close during the mornings. It should also be noted that even when a class waited for classes at the other sites to arrive, that time was not lost; many students indicated that the time was important for getting questions answered, rapport building, etc.

The movement of materials (handouts, assignments, tests, etc.) remained a major logistical problem for both teachers and students. It is anticipated that the solution to the problem will be technological.

If shared resources between the schools can be taken as evidence of cooperation on the logistical demands of the system, then the use of the two-way system can be considered at least a moderate success. Over 1,100 hours of course instruction were

transmitted to over 150 students in the eight schools. Other activities conducted via the two-way system included summer creative writing, a music clinic, a choir exchange, classes from the University of Wisconsin-Eau Claire and the Western Wisconsin Technical Institute, quiz bowl, junior high math challenges, and FHA meetings.

Findings related to the overall impact of the Project.

While there is no hard evidence to indicate the amount of learning on the part of students using the system, the perceptions of both teachers and students was that learning via the system was as effective as learning in a "home" classroom. Over 70% of the remote site students interviewed indicated that they thought they learned as much via the two-way as they would have learned in a traditional classroom. While this is by no means definitive, it indicates that the perception of learning exists among students at the remote sites.

While there may have been any number of unintended outcomes which have resulted from the Project, one most frequently emphasized to the Evaluator has been the improved performance of the teachers participating in the Project. Several administrators commented that during the course of the year they had watched a good teacher become an excellent one. The involved teachers also expressed increased satisfaction with their performance. In addition, many of the teachers involved have received outside recognition for their work.

A second outcome which might be noted was the decreased school chauvanism on the part of participating students. This

factor was mentioned by several building administrators and was indicated in interviews with participating students. While it is not agreed whether this phenomenon was positive or negative, it was noted that the only other time when many of the students interact had been in athletic competition.

Recommendations

The following recommendations are made on the basis of information gathered from interviews of teachers, building administrators, district administrators, technical experts, school audiovisual personnel, the Project Director, and students.

Recommendation 1: While it is realized that the coordination of activities between eight separate and independent school districts, each with its own unique philosophies, procedures, and problems is a difficult task, the success of the project depends on the degree of cooperation between the schools. An effort must be made to facilitate the use of the system for both students and teachers. Thus far there is little evidence to indicate that a sufficient amount of cooperation and compromise has taken place to enable the Project to be a success. Additional effort must be made to achieve some degree of standardization of school calendars and daily schedules. This recommendation does not mean that all eight schools must adopt identical calendars and schedules, but days and times must be made available for students and teachers to make use of the system on a regular basis and without interruption caused by calendar and daily schedule incompatibility.

In addition, an effort must be made to identify the type and amount of credit awarded a student for participation in a television course. While an extensive investigation was not made of this concern, more than one building administrator indicated that this has been, or could be, a problem for students taking courses via the two-way system.

Finally, an effort must be made to develop a coordinated and consistent curriculum for the eight schools participating. Rather than developing curriculum on an ad hoc basis, greater planning is needed to insure consistency and continuity. When a student sits down to plan his or her courses of study, there must be some assurance that the courses indeed will be offered at the appropriate time. What good is Spanish II if a student has been unable to take Spanish I? Not providing the needed coordination is a disservice to the student, a discredit to rural public

education, and validation of the arguments made by the critics of the small school.

Recommendation 2: Each school should ensure that a place is available for use of the two-way system that is free from interruption and which has adequate lighting and electrical service for the necessary equipment. In addition, it is desirable for each site from which instruction originates to have two cameras and the necessary switching devices in addition to a separate monitor for each remote site served. Each site (whether remote or origination) should have the proper number and types of microphones so good quality audio communication can be achieved; this may mean acoustical treatment to the room as well as proper equipment.

Recommendation 3: Because of the difficulty and time delays involved in land transportation of materials such as tests, worksheets, and assignments, some improved means of transmitting written (paper) information needs to be devised. Teletype or computer network may solve this problem.

Recommendation 4: A concern was expressed by some members of the Evaluation Advisory Committee, by some teachers, and by some administrators related to the possibility that persons with televisions attached to the cable system in the communities could receive school instruction telecasts. They felt that this situation could endanger academic freedom, inhibit both teachers and students, and that normal instructional practice could be taken out of context by persons viewing the instruction. This concern is probably well founded. Therefore, it is recommended that devices be installed with which school personnel can selectively scramble transmissions.

Recommendation 5: In view of the concerns expressed by many teachers about the effects of the two-way system on the security of their jobs, it is essential that the Project Director, school administrators, and teachers' organizations jointly address this issue. It is therefore recommended that the teachers' organizations become involved with the two-way system and that uniform policies regarding job security and compensation for involvement in the Project be developed among the eight school districts.

Recommendation 6: Project CIRCUIT is on the threshold of a major change in the delivery of instruction, for it is an attempt at the movement of instruction to students rather than the movement of students to instruction. Because CIRCUIT is completely untried, much is yet to be discovered in terms of logistics, instructional methods and strategies and so on. An attempt should be made to move from the ad hoc discovery and diffusion of information about the system and its use. Therefore, it is recommended that a major effort be made to obtain funds for systematic research efforts into the effects of instruction via interactive two-way television instruction.

Recommendation 7: It is recommended that the quality of the video and audio transmissions be closely monitored in the coming months to be certain that the modifications made by WCC maintain high quality.

Recommendation 8: It is recommended that more intensive effort be given to providing inservice instruction to teachers regarding how to more effectively teach using the two-way system. In addition, it is recommended that more students be trained to do more technical procedures, such as camera operations.

Conclusions

Has technology, in this case a two-way interactive instructional television system, provided the greater flexibility in curriculum and helped overcome distance, transportation, and cost barriers in providing quality programs? The answer must be a qualified "yes."

Although the findings and recommendations cited above could indicate that improvement can be made in the situation in Trempealeau County and Project CIRCUIT, a great deal has been accomplished. None of the people interviewed indicated a desire to dismantle the two-way television system. Many of the building administrators emphasized the potential use of the system. To them the system functions as a curricular safety net--something they hope will not be needed, but nice to have when faced with declining enrollments and uncertain funding.

It is a fact that students in the schools of Trempealeau County now have access to courses in Spanish I and II, German I, advanced mathematics, shorthand, digital computer logic, computer programming, careers, and television production. A physics course is in the planning stages. In addition, creative writing is available as a summer course and adult computer literacy has been

offered in evenings. Normally, such curricular offerings would be impossible or would involve transporting students to the schools where the classes were taught.

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